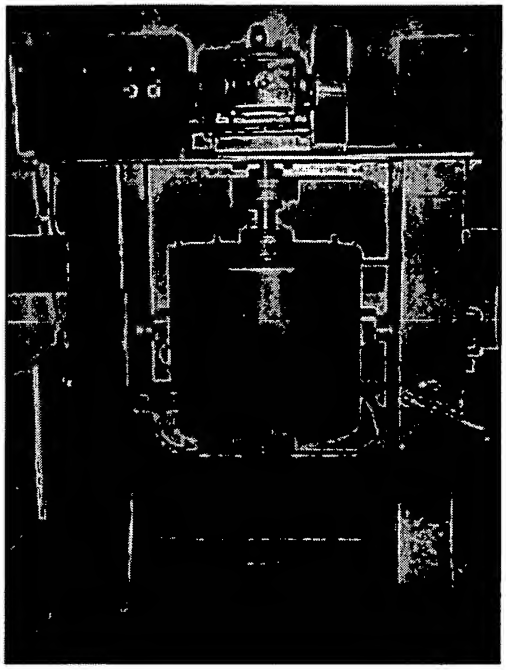
MICRONIZATION OF NATURAL GRAPHITE POWDER



Introduction

Graphite powder in micron size range is one of the basic requirements for making its colloidal suspension in aqueous or organic medium. To improve upon the functional properties of suspension, it is desirable to have accurate and reproducible size distribution of graphite powder. Grinding of graphite powder in narrow range is thus, an important unit operation. Commercially available graphite powder has average particle size in the range of 8 to 10 μm. Literature survey on the grinding of graphite indicated that the grinding below 10 microns is difficult and is further adversely affected by the presence of absorbed moisture or organic matter. The reason for difficulty in grinding of graphite is mainly attributed to its hexagonal layered crystal structure. During grinding, most of the energy is consumed in causing slip in the layers rather than fracturing the particles.

Commercially available grinding equipment including high energy mills have not been able to generate powder down to 2.0 μm size in wet or dry condition. BARC has developed a novel technique for efficient grinding of Natural Graphite.

Applications of Micronised Natural Graphite Powder

Major application of micron size natural graphite powder is in the production of colloidal suspensions for use in metal forming industry.

Process

Simple Process and related equipment design, low capital and maintenance cost are the salient features of this process. The wear part of this process is the grinding media. The grinding media used is commercially available in the local market. Besides the simplicity, another most

important feature of this process is the low specific energy consumption to produce powder in the desired size range.
The process parameters and its related equipment design permits scaling up of its production to commercial scale. The simple design of grinding mill permits easy and quick dismantling for cleaning, thus facilitating change of operation from one material powder to another.
This mill can grind 2.75 kg of natural graphite to less than 2 μm in 12 hours. Energy Consumption per batch is 40 kwh.

Raw Materials

All the raw materials are produced within the country and are available in local market.

Infrastructural Facilities

Fabrication of Equipment : General fabrication and Machine shop with Rolling and Argon Gas welding facility.

For setting up a Micronization plant.

- Space : 5m x 4m x 4m
- Power : 18 KVA, 3 phase, 415 V, 50 Hz
- Water for mill : 5 lpm at 3.5 kg / cm^2 cooling water or
- For filtration unit : 10 - 15 lpm at 3.5 kg/cm^2 process water
  200 liters per batch of salt dissolution & cake Washing (min.3-4 washing will be necessary)

Manpower

- One engineer, one supervisor and a technician to observe the process and testing of ground powder.
- One helper for handling the material during the process.
- One electrician and one fitter for electrical connections / dismantling / assembly and troubleshooting.

For details contact :

Head, Technology Transfer & Collaboration Division,
BHABHA ATOMIC RESEARCH CENTRE,
TROMBAY, MUMBAI - 400 085
Tel : 091-022-25505337/25593897
Fax : 091-022-25505151
Email : headttcd@magnum.barc.gov.in